ENERGY FACILITY SITE EVALUATION COUNCIL
STATE OF WASHINGTON

IN THE MATTER OF APPLICATION NO. 96-1 OLYMPIC PIPE LINE COMPANY CROSS CASCADE PIPE LINE PROJECT	APPLICATION NO. 96-1 PREFILED TESTIMONY OF THOMAS R. BOYER EXHIBIT ____________ (TRB-T) **ISSUE**: PHYSICAL IMPACTS TO THE JOHN WAYNE PIONEER TRAIL (JWPT) **SPONSOR**: WASHINGTON STATE PARKS AND RECREATION COMMISSION

Q. Please provide your name and business address to the Council.

A. Thomas R. Boyer, PE
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Q. Please summarize your employment and educational background.

A. My job title is Manager, Facilities Policy & Capital Budget Program for the Washington State Parks and Recreation Commission. My primary job duties are to counsel and advise the agency in areas of engineering policy and facility management. I was first employed by Washington State Parks as Assistant Chief Engineer in 1991, promoted to Chief Engineer in 1992, and subsequently assumed my present position as Facilities Policy Manager in 1998. I was previously employed by Washington State Department of Fisheries (1976 to 1990) and Department of Corrections (1990 to 1991) as a design engineer. I have been a registered professional engineer in Washington State (Civil) since 1986. I have a Bachelors degree in civil engineering from St. Martins College,

1983. I have been employed in the engineering profession and in state government public works engineering since 1976. Much of my work experience has focused on earth excavation projects for pipelines (with Department of Fisheries) and small structures including small bridge design.

Q. Generally, what is the subject of your testimony?

A. I will provide testimony regarding the physical impacts to the John Wayne Pioneer Trail (JWPT) which may be caused by the proposed pipeline construction, restoration efforts necessary to return to the trail to an acceptable condition, construction safety, excavation within the trail, and general trail drainage including provisions for culverts.

Q. How are you familiar with the JWPT?

A. I have been involved in a program supervisory role with several agency-sponsored projects on the JWPT. These projects have included repairs to concrete liners in tunnels, repairs to trail surfacing, construction of new trailhead facilities, bridge and trestle repairs and large scale repairs to major culvert structures. The JWPT is a keynote facility in our state park system and has an on-going capital improvement program which I either supervised from an engineering role as Chief Engineer or for which I am now involved in establishing policy and capital funding. I have on several occasions traveled the length of the trail, have conducted numerous assessments, and have provided a considerable amount of engineering review and opinion as to the condition of the trail, drainage systems and contributing drainage areas, land stability, tunnels and other structures. I also give engineering opinion as to the trail's ability to provide appropriate and safe public recreational use, which has resulted in my condemning snowshed structures and setting acceptable limits for trail surfacing in the Snoqualmie Tunnel.

Additionally, I was the agency engineer who reviewed and approved the construction procedures for the fiber optic telephone cable installed by WorldCom in 1996. I was on-site on several occasions during the excavation, installation and restoration of its project. I made the final determination as to an adequate and acceptable limit for project site restoration.

Q. Are you familiar with the proposal by the applicant in this proceeding, Olympic Pipeline Company, to construct a petroleum pipeline within portions of the JWPT?

A. Yes. I have been involved since the Olympic Pipeline Company (OPL) first contacted State Parks about installing its pipeline in the JWPT. My focus has been on the construction aspects of the proposal and its impacts to the physical attributes of the trail. I have a general understanding of the construction and excavation techniques that are typically used on similar pipeline projects. I have reviewed the applicant's proposed construction techniques for installation of its pipeline on the JWPT as described in its application to State Parks for an easement, its application to EFSEC for site certification, and the Draft Environmental Impact Statement (DEIS) for the Cross Cascade Pipeline. I have had several conversations with the applicant's engineering representatives about the applicant's proposed construction methodologies. I have reviewed other documents and sketches submitted by the applicant to State Parks (such as earlier versions of options for installation of the pipeline in the tunnel), watched a video presentation of OPL's pipeline system, met both on-site and off-site with several engineers representing the applicant, and I have conducted an aerial observation of the proposed pipeline route through the Snoqualmie Pass and Ellensburg areas.

Q. Generally describe the JWPT and its construction.

A. The trail was originally constructed in the early 1900's as a railroad bed and, consequently, has low grades, long radius curves, and was built on a solid subbase of well-compacted soils. On top of the subbase was a course of crushed rock ballast that formed the bedding material for the ties and rail iron. There were more than a hundred significant structures on the JWPT including long, high wooden trestles, steel truss bridges, concrete lined tunnels, wooden snowsheds and buildings. Large diameter (6 feet and greater) masonry walled, concrete bottom culverts were installed where the railroad grade crossed ravines and streams. Native materials from the tunnels were used as fill over the culverts.

Today, the JWPT trail surface can generally be described as a crushed rock surface approximately 20 feet in width. Much of the original railroad rock ballast was lost when the rails and ties were removed and through years of grading. The subbase bed has been dramatically altered from excavations for two fiber optic phone cables, but it remains fairly stable. The trail is now used by hikers, bikers, horseback riders, horse-drawn wagons, dog sleds, and cross-country skiers. State Parks' maintenance crews over the years have added 5/8" minus crushed rock to the trail surface, and they try to maintain an approximate gravel depth of 4". The trail is graded periodically by park staff to maintain the trail's alignment and keep its overall width to about 20 feet (the trail gets wider because the gravel tends to migrate to the edges with use and snow grooming). State Parks' staff grade the ditches to remove vegetation and other debris which would impede drainage. Small diameter drainage culverts have been installed by State Parks' staff across the trail in many places to provide surface water run-off drainage.

Several of the original bridge and trestle structures have been removed or were lost to catastrophic failures. Two of the original large culverts were destroyed due to blockage and overtopping. Formerly, four wooden snowsheds protected the railroad from avalanches and rolling rocks, but those have been removed as hazards to the public because of their disrepair (only a small representative of the original structures remain for historical interpretation).

There are now two buried fiber-optic telephone cables nominally in the southern half of the trail. The first cable was installed by AT&T in the late 1980's. It is not laid in a straight line but rather it meanders across the width of the trail to avoid buried obstructions like rocks. The WorldCom fiber-optic cable, installed in 1996, was held to more stringent alignment. It crosses the AT&T cable in several places. Both cables are placed in steel conduits across bridges and in the Snoqualmie Tunnel. I will discuss these in more detail below.

As noted above, approximately eight hand-made, large diameter culverts of original railroad construction provide cross-trail drainage for streams and intermittent high volume drainage run-off. These culverts remain today because State Parks has made maintenance and structural improvements to extend their life and function. They are typically brick masonry arches with concrete floors and are usually buried in deep (greater than 20 feet) fills. They are unique structures because of their size, their age, their construction, their long extreme gradients, and because they drain extremely large drainage areas. When the railroad company built these culverts, they were sized to drain the Snoqualmie forest as it existed in 1900. Today, much of that forest has been harvested, and the run-off has increased dramatically. State Parks' expends a great deal of resources (personnel and equipment) to maintain these culverts and keep the openings clear of debris and eroded soils. When these culverts plug, the railroad fill becomes an earthen dam, which in some cases can impound water over 30 feet deep.

There have been three catastrophic failures in the trail since the mid-1980's caused by impounded drainage water. A plugged culvert at Olallie Creek in the early 1980's resulted in a massive earth dam failure that destroyed the county road at Olallie and nearly damaged I-90. Also in the 1980's, a debris dam at the Hall Creek trestle caused a collapse of its middle span, leaving a gap in the trestle. The most recent culvert failure happened in 1989 at Carter Creek when its culvert plugged, impounding more than 30 feet of water that overtopped the trail. The resulting mud slide covered Tinkham Road and broke AT&T's fiber-optic cable.

OPL's pipeline alignment sheets, as submitted in their easement application to State Parks, shows the pipeline in close proximity to the following major creeks on the JWPT: Alice Creek, Humpback Creek, Olallie Creek, Mill Creek, Cold Creek, Roaring Creek, Meadow Creek, and Mosquito Creek.

Q. Describe your general understanding of the geology the JWPT .

A. While not formally educated in geology or rock morphology, nor claiming formal experience in rock excavation or rock engineering, I have been on-site on the JWPT on several occasions during excavation for the WorldCom fiber-optic cable and other projects. So I have some knowledge as to the difficulty those contractors had in excavation and backfill operations on the trail in general.

Based on my witnessing other excavation projects on the JWPT, there is no single description that typifies the subsurface strata of the entire length of the JWPT, especially in the Snoqualmie Mountain area. In some areas (along Keechelus Lake, for example) the rock is at the surface and the trail is literally cut through solid rock outcroppings. In other areas, such as the deep fills over stream gullies on the western slopes, the materials are generally a mix of soils and rocks excavated along the route of the railroad during its original construction. In general, I would characterize the rock under the JWPT from Garcia to Easton as being either solid rock or very large boulders mixed with soil that is extremely hard and not easy to trench or excavate. OPL's EFSEC application and DEIS give more scientific descriptions of the rock and rock structure of the Snoqualmie area.

Q. Describe the fiber-optic cables in the JWPT, how they were installed, and what impacts their installation had to the trail.

A. There are two fiber-optic cables buried in much of the JWPT along the preferred pipeline route on the JWPT. Both cables are generally installed in the southern half of the existing trail.

I understand, from State Parks' oral history of the JWPT, that the first cable was installed in 1987 by AT&T using trenching machines, cable plows and backhoe excavators. Its cable was generally installed on the southern edge of the trail, at about 3 feet deep. However, as we found from cable locating during the WorldCom installation, AT&T's cable meanders across the width of the trail, presumably to miss buried rock or other extremely difficult excavation. AT&T buried junction boxes and installed other facilities on the trail. I have no other first hand knowledge about the construction or installation of the AT&T cable.

WorldCom installed its fiber-optic cable in the JWPT in 1996. Its installation was rigorously controlled by terms of an easement issued by the Commission and monitored by State Parks' staff. This cable was installed 10 feet south of the then-existing centerline of the trail, and was buried approximately 3 feet deep.

The cable installation process included pre-installation work by State Parks' staff who paint-marked the visual centerline of the trail (this was not a formal survey), followed by AT&T staff who located their cable and other buried equipment by paint-marking their locations on the trail. WorldCom's contractor began installing the cable by making one or more passes along the cable route with a dozer equipped with a ripping tooth. This initial ripping process was intended to loosen the soil structure so that the cable could be laid without actually opening a trench. The cable laying equipment consisted of another dozer with a ripping tooth attachment that spread the soil and placed the cable in the bottom of the trench in one pass. This technique was called "plowing" the cable because the cable placing tooth looked like a plow head and the operation left a furrow like a plowed field. A third dozer, sometimes a backhoe and grader, came behind the plow to smooth the trench line, regrade and restore the trail surface. Cable splicing structures were buried at specific points along the JWPT based on reel lengths of the cable and/or other cable parameters as determined by WorldCom. The cable was routed through steel conduits whenever it was hung from bridge and trestle structures. Cable markers were installed along the trail as off-set reference measurements for as-built location and mapping.

WorldCom's heavy equipment traveled up and down the trail a great deal. The company also moved its dozers and other heavy earth moving equipment over State Parks' trestles and bridges along the cable route. It had three construction gangs, each with about six people and seven pieces of equipment or vehicles. Its heaviest piece of equipment was a track-mounted trencher. These two crews were able to install more than a mile of cable per day, except in the Snoqualmie Mountain area where the rate of installation was significantly slower—at times probably less than a quarter-mile per day. Inspectors from

WorldCom, AT&T and State Parks were always on-site during construction to monitor the installation and assist in resolving cross-over routing of the two cables.

This process was successful over much of the length of the JWPT, except in the Snoqualmie Mountain area and in the Snoqualmie Tunnel. For approximately seven miles of cable installation in the Snoqualmie Pass, tunnel and Keechelus Lake areas, the contractor would make an initial pass of the ripping tooth to identify areas for rock excavation. In areas where the ripper could not separate the rock for the plow, trackhoe excavators were used to jack-hammer the rock and dig a trench. The rock was removed from the trench and cast to the side of the trail where it was either left as fill material or hauled to a State Park-approved disposal site.

The two and one-half mile tunnel was very difficult excavation because of the hard rock, close proximity to the AT&T cable, confined work space, and miserable weather. WorldCom used a ripper, jack-hammer, and excavator to excavate a 12” wide trench about 18” deep. A steel conduit was laid in the trench to provide additional protection for the cable, because it could not be buried deeper. Restoration of the tunnel trail included hand raking and removal of rocks larger than 1¼” in diameter.

Damage to the trail surface from WorldCom’s vehicle traffic was repaired mostly by grading the crushed rock top course. State Parks has subsequently brought in more crushed rock surfacing because WorldCom’s traffic accelerated the normal wear-and-tear on the trail. WorldCom was diligent in protecting our structures from its equipment, especially grouser damage to wood decking on our trestles. Sadly, the only significant structure damage resulted in a construction fatality when a piece of equipment rode off the decking and fell from a cantilevered portion of a trestle.

In my opinion, WorldCom did a reasonably good job of restoring the trail to its pre-existing condition, given the magnitude of the excavation and difficult work environment. Nonetheless, there are three major impacts to the trail from the WorldCom project that remain a disappointment and maintenance burden for State Parks' staff: significant and permanent changes in alignment and grade; creation of a wider trail surface; and degradation of the crushed rock top course.

As described above, large rocks were excavated from the subgrade of the trail which left voids in places in excess of 10 cubic yards. No soil was imported to replace the volume of the removed rock. Instead, WorldCom graded long stretches of the trail (construction jargon is "drifting") to fill those voids and re-establish a uniform grade. The result was a loss of trail elevation (created swales and dips) and displacement/realignment of the trail centerline. A defining characteristic of the trail is its gentle grades which are particularly desirable for wagon trains, cross-country skiers, bikers and hikers. Some parts of the trail now have steeper grades because of WorldCom's project. This is a disappointment to many of our park users as well as to agency historians.

Similarly, the over-excavation of the rock and the contractor's effort to restore the trail by grading adjacent stretches of the trail for backfilling materials resulted in a wider trail surface with a thinner top course of crushed rock. We now have more trail surface area with a very thin top course for park staff to maintain. In addition, the ripping and plowing operations brought large pieces of fractured rock (bigger than basketballs) to the trail surface which became mixed with the crushed rock surfacing during the grading. Today, our park maintenance and operation efforts are hampered by having to manually remove these unacceptably large rocks from the trail surface.

Q. Do you believe the construction of the proposed Cross Cascade Pipeline would adversely impact the JWPT?

A. Yes. Based on my experience and observations from the installation of the small 3" diameter WorldCom fiber-optic cable, it is my opinion that construction of the pipeline will forever change the JWPT from its present physical condition—that no restoration effort will return the trail *exactly* to its present state.

Given that the fiber-optic cable installation was much smaller in scope and scale of work than the proposed pipeline; and, that its installation resulted in significant, permanent changes in the trail and our trail maintenance, then by reasonable projection, I believe that the impacts to the trail will be on a proportionally higher scale for the pipeline. I envision impacts to the trail to include: a significantly wider trail surface that is lower in elevation, having steeply graded swells and dips along the longitudinal trail centerline; new and different surface water runoff routes; potholes; loss of top course crushed rock surfacing; reposition of subterrain rock up to the surface or near surface of the trail; new deposits of huge boulders from the excavated trench; damaged or destroyed vegetation; new access points onto the trail; and much accelerated wear-and-tear on the trail.

The character and quality of the trail surfacing crushed rock is critical to park users—so much so that State Parks is adopting a Master Plan for the trail that includes specifications for acceptable trail surfacing. The surface of the trail is "the trail".

The size and sharpness of the crushed rock top course surface has been deliberately picked by State Parks to accommodate snow grooming, horses, walkers and bike riders. The physical size of the crushed rock top course defines the public use of the trail. If it's too big and sharp, it is unacceptable to hikers and bikers and it injures horse hoofs. If too small, it deteriorates too quickly and is too easily lost in snow-grooming operations.

Of equal concern to agency maintenance staff, is their ability to effectively re-work disturbed portions of the trail, especially where large rocks have been excavated and brought to the surface or shallow depths. For example, when the subsurface was disturbed by WorldCom's installation of its fiber-optic cable, rocks were brought up to a shallow depth and protruded into the top course surfacing. Those rocks can be hooked with our road grader and pulled out of the ground. When this happens, and it continues today—two years after WorldCom's construction—agency staff have to manually remove the rock from the trail surface since leaving the rocks on the trail surface poses a hazard to walkers, bikers and horses. This is a major work load impact to a staff with limited equipment and personnel assigned to the JWPT.

In short, whenever the trail gets dug up, we get a different trail with different maintenance and operational requirements that almost always cost more money for maintenance.

Q. **Can you summarize your concerns about the impacts of the pipeline to the JWPT as described in the EFSEC application and DEIS?**

A. Yes. Regarding the construction of the pipeline, I believe there will be direct impacts to the JWPT where the pipeline is dug into the trail, and I believe there will be impacts to the trail due to construction activities even in those sections of the pipeline route which are not on the JWPT itself. There are impacts on the trail due to excavation and impacts on the trail due to use (both during construction and during maintenance of the pipeline thereafter).

In discussion above, I have described the trail's existing drainage systems which consist of deeply buried culverts and numerous shallow cross-trail culverts. I have also discussed the existing trail surface and how the fiber-optic cable installation affected the geometry and management of the JWPT. I have other concerns about safety, customer (park user) interplay during construction, and subsequent pipeline maintenance. Each of these topics has direct (caused by the excavation and pipeline installation) and indirect (caused by traffic on the trail as the pipeline is constructed and maintained) impacts to the JWPT.

Q. Describe the surface water drainage conditions on the JWPT.

A. Surface water drainage is vital and critical to the life of the trail. Much of the normal trail degradation is due to rutting and erosion from high volume, surface water drainage rapidly moving over the trail surface.

Groundwater seeps from the banks almost the entire length of the trail in the Snoqualmie Mountain area year round. Spring thaw of snow and ice typically create high volumes of surface water runoff in a very short time, since early spring thaw events usually occur with warm rain onto the compacted, frozen ice on the trail. The rain runoff, together with water from the melting ice and groundwater from seeps, flows in sheets over the trail and into the drainage ditches. Cross-trail culverts transport surface water drainage from the uphill side of the trail to the downhill side. The side trail ditches are maintained by State Parks' personnel by periodic grading and cleaning of the ditches. The Snoqualmie Tunnel has drainage scuppers on either side of the trail that drain the seepage in the tunnel. These scuppers tend to fill with loose gravel or freeze and inhibit free drainage.

Q. How might the proposed pipeline construction affect water run-off?

A. I have two points: surface water drainage and migrating water in the trench.

As noted above, it's vital that surface water is adequately directed off the trail surface and away from the trail subgrade. The cross-trail culverts are key elements to proper discharge of surface water. The culverts are also quite close to the surface of the trail and have minimal ground cover. It's my opinion that the intense construction activity on the trail will accelerate the deterioration of the cross-culverts due to the weight and impact (bouncing) forces from the various types of equipment needed to install the pipeline. Vehicle traffic will also push gravel and dirt into the side ditches. This is especially probable in the tunnel, where current maintenance vehicle traffic pushes the trail gravel into the scuppers. If these ditches become plugged or the cross-culverts collapse due to construction activities, the surface water drainage is severely interrupted, jeopardizing the trail subbase to super-saturation that leads to potholes or other forms of trail failure.

Migrating, longitudinal sub-surface water flow in the excavated trench was only discussed in the EFSEC application and DEIS relative to pipeline routes through wetland areas. I believe the situation is similar over much of the excavation in the Snoqualmie Mountain area where the pipeline will be installed in nearly solid, impervious rock. I am concerned that the pipeline trench will in effect become a collection and storage system of surface and shallow sub-surface water. Compared to the surrounding solid rock, the trench is the path of least resistance to percolating surface water, so it seems plausible that those surface waters would enter the ground over the pipeline excavation. Once in the trench, that water could further infiltrate and eventually super-saturate fill soils causing unacceptably soft trail surfaces, potholes, or mass soil failures.

In those sections of the route over gullies and ravines, there is also a possibility that percolating water from the pipeline trench could eventually create new hydraulic piping routes around the deeply buried masonry culverts. If that were to happen, the soil structure around the culvert or the cements that bind the masonry bricks together may erode, both events leading to a weakened structure. The danger associated with these kinds, or any kind of degradation to these deeply buried culverts, is of a catastrophic failure of the soil and/or culvert. Because of their depth, gradient and physical setting, *in situ* inspection of a culvert's condition is beyond any capability of State Parks.

Although the applicant's excavation work may not directly damage these structures, infiltrating water may accelerate their failure. OPL should be required to specifically address this issue before any decision is made about authorizing their project. While future blowouts of these culverts may not be an effect of the pipeline installation, certainly the pipeline's structural integrity will be affected by a catastrophic, large scale failure of the fill. The pipeline is in jeopardy, even if it is not placed in the fill. History has shown that the other soil failure events exposed and eroded several feet of soil depth downhill from the trail—precisely the location where the pipeline could be routed.

Q. What measures can or should OPL undertake to reduce or eliminate impacts to surface water drainage?

A. At a minimum, OPL should be required to regrade the drainage ditches on both sides of the trail to adequately drain to cross-trail culverts. In areas of the trail where the pipeline is installed, these ditches and culverts will have to be re-established after the trail is rebuilt, because the trail will have a different configuration than currently exists (refer to comments above about realignment of the trail due to removal of rocks). Where the applicant only uses the trail for access, OPL should grade those ditches for proper drainage and any damaged cross trail culverts replaced in-kind.

OPL should install perforated piping all along the pipeline excavation in the Snoqualmie Mountain area, with appropriate numbers and locations of outlets for proper drainage. In the tunnel, OPL should be required to install perforated drain piping. Numerous trench plugs, as described in the application to EFSEC, will be required to contain and direct subsurface migrating water in the pipeline trench to proper relief points.

Q. What kinds of restoration efforts will be necessary to return to the trail to an acceptable condition?

A. As stated above, I do not believe the trail can be restored to its exact existing condition. But I do think the trail can be reasonably restored to an acceptable level of use.

OPL must be required to completely restore the trail. In my definition, "complete trail restoration" includes off-site disposal (either off State Parks' property or to a State Parks-directed disposal site along the trail) of all excavated rocks greater than 1 cubic foot in volume. It also includes importation, placement and compaction of suitable sub-base backfill to restore the trail elevation to its original railroad grade and elevation; importation, placement and compaction of suitable crushed rock bottom course; and, importation, placement and compaction of suitable crushed rock top course. OPL must restore all portions of the trail that it has used for either pipeline burial or for job-site access—essentially the entire trail from Olallie to Stampede Pass.

Trail restoration in the tunnel is even more critical because of the additional risk to park users in the tunnel. People enjoy walking in the total darkness; and, not all of our park patrons are fully able-bodied. Therefore, it is imperative that the tunnel drains properly through its drainage scuppers, the trail surface material in the tunnel is void of tripping hazards such as rocks, and the trail is even, without dips or potholes. The choice of trail materials used in the tunnel must be only as approved by the agency.

Q. Discuss possible impacts to the trail structures.

A. The EFSEC application and DEIS describe the proposed route of the pipeline through the Snoqualmie Mountain area as not having to cross any existing bridges or trestles. However, the application does diagram possible pipeline hanging options should the pipeline route change such that it would be necessary to cross a waterway using a bridge or trestle on the JWPT. Regardless of the pipeline construction, there could be significant impacts to the bridges and trestles just from all the vehicular and equipment traffic.

The applicant should be aware that State Parks has not conducted condition assessments of its bridges or trestles on the JWPT. Because we do not know the loading capacity of these structures, OPL must be required to conduct complete and comprehensive structural condition analysis of all bridges, trestles or crossing structures to determine if the structure is adequate for the vehicular and equipment loads imposed by their construction activities.

Q. You've described impacts to drainage systems, trail surfacing and trail structures. Do you have other areas of concern relative to impacts to the JWPT and the proposed pipeline construction?

A. From my reading of the EFSEC application and the DEIS, and from my past discussions with the applicant's engineering staff, I am also concerned that the applicant may not have adequately considered the following incidental items related to construction and maintenance of the pipeline: the logistics of the installation process; emergency response to construction accidents; security of the contractor's equipment and materials on the trail; sanitation; or weather in the Snoqualmie Mountain area and its impact on the construction progress.

The JWPT is called a "linear park" for a good reason. For the most part, that means there is only one-way in and one-way out. The application refers to a work force of 159 workers and their equipment (not specified as to number of pieces but I have estimated there to be more than 60 vehicles and/or equipment) spread out over the active construction area which is given as about 0.5 mile/day. The application says that in narrow construction corridors, they will have to make a continuous loop by driving a significant distance on the trail—which is not given, but is approximately 30 miles round trip on the west side of Snoqualmie Pass and about 40 miles on the east side. Access to the JWPT is extremely limited from Garcia to Snoqualmie Pass (Hyak) through the tunnel, and again from Hyak to Stampede Pass. Any piece of sizable equipment (such as truck and trailer and even pickup trucks) will have to make these round trips during the work day. Even for those sections of the pipeline route which do not lie on the trail itself, these workers, equipment and materials will be transported to the job sites over the trail. This level of intense construction activity will severely limit public use, and will accelerate wear-and-tear on the trail.

Weather patterns in the mountain area will have considerable impact on construction progress not only in terms of cold, wet weather on the crew, but also in terms of frozen ground which turns to mud when disturbed. Open trenches will be subject to infiltration from rain water and snow melt. Typically, the construction window in the mountain area is late-June through early-September. The weather will also affect the transport of workers, equipment and materials from their housing/staging areas to the trail. (Other JWPT contractors have been prevented from working for days due to closure of I-90.)

Q. Do you have any particular concerns regarding construction safety, especially as it relates to construction—public use conflicts?

A. Emergency response to accidents, both to the applicant's workers and to the general public, will be severely limited by the number of workers and equipment on the trail during construction and to the restricted trail access. Members of the general recreating public will without doubt intrude into the work site regardless of the level of management effort to keep them out. The public is all over that mountain area during the summer. (WorldCom's construction site was visited daily by hikers and bikers during its construction.) Given the number of workers and equipment on the job site, the likelihood of a public safety incident seems very high and must be given some deliberate consideration.

The applicant may not be aware of the potential for vandalism and damage to its workers, equipment and materials. The Snoqualmie Mountain area is remote and open to hunting or target shooting. Contractors on other jobs on the JWPT have reported their vehicles being shot and their job sites vandalized. Confrontations between workers and the general public have occurred before and are likely to occur again with the pipeline project especially if the public feels they are being denied their "right" for access to the trail. Recreation is sometimes intense.

Q. Given your familiarity with the JWPT and your on-site experience in witnessing the WorldCom fiber-optic cable installation, do you have an opinion as to the reasonableness of the applicant's assumptions regarding its rate of construction on the trail?

A. OPL's revised EFSEC application, on page 2.12-5, states: "…assuming favorable weather, the construction spreads will progress…0.3 to 0.5 mile/day for Spread 2 (Snoqualmie Pass narrow corridor)…" and that "…pipeline construction at any one location along the route is no more than 10 days." Spread 2 consists of 159 workers, nine of whom are non-craft administrators. I was unable to determine how many pieces of equipment were associated with this Spread, how many work hours per day–days per week were calculated in the installation rate or what time of year the construction is expected to take place in the Snoqualmie Mountain area. The application says the pipeline enters the JWPT at about MP 42.5 and exits at MP 73.4, a distance of approximately 31 miles. With all the right conditions, the applicant is saying they will complete work with this Spread in 60 to 100 days. As a reminder, the scope of work is the installation of a 14" diameter steel pipe in a trench that is fully excavated to about 24" wide by 4 feet deep in a highly rocky, difficult terrain. The trench will be backfilled and the site restored.

By comparison, WorldCom had three crews consisting of six workers (one of who was a foreman) working 12 hours per day, six days per week. It installed a direct burial fiber-optic cable using a plowing operation (minimal number of open trenches) to an average depth of 3 feet through this same 31 miles. WorldCom's project took about 105 days to complete—which computes to about 0.3 miles/day. WorldCom had favorable summer weather except for about 30 days of light snow but rather cold temperatures. The tunnel took about 15 days for one crew of six workers. WorldCom also crossed streams by hanging its cable in conduit. They were not allowed to blast rock, but they had a rock cutter and several trackhoe-mounted jack hammers. WorldCom also did not import any backfill material, which is a suggested restoration requirement for OPL.

In my opinion, I believe the OPL proposal is substantially grander in scale than the WorldCom project. I think a more reasonable rate of installation for OPL when compared to WorldCom would be 0.2 mile/day or about 150 days.

I have made the above statement without qualification as to the care and diligence and craftsmanship of the OPL construction crew. Because of the pristine natural area and the high quality recreation in this area, the constructed work will be closely monitored with corrective work imposed on any installation which does not satisfy very particular and stringent quality control standards. As stated earlier in this testimony, WorldCom's project was not fully satisfactory to user groups and agency staff. OPL should consider a slower pace that creates high quality work.

DATED this ______ day of February, 1999.

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THOMAS R. BOYER